The same seems to be nearly the case with a second species of *Heloderma*, *H. suspectum* of Cope,[1] a portrait of which we give (Fig. 28) from a fine specimen recently added to the Zoological Society's collection. Experiments made with this animal have shown that it is sufficiently venomous to kill a small guinea-pig, and, as hereafter shown, there is no doubt that its bite inflicts serious injury upon any one handling it carelessly.

The Sonoran Heloderm, or "Gila Monster," as the inhabitants of Arizona call this reptile, is one of the largest lizards in North America, and is found all through New Mexico, Arizona, and Texas. It inhabits the sandy deserts of that arid land, and is said to be a wonderfully striking object as it darts about the rocks, and shows its brilliant armour of jet black and orange scales. In a recent number of the *American Naturalist*. Dr. Shufeldt gives the following account of his experiences with one of these "monsters":—

On the 18th inst, in company of Prof. Gill, of the Institution, I examined for the first time Dr. Burr's specimens of the Heloderm, then in a cage in the Herpetological Room. It was in capital health, and at first I handled it with great care, holding it in my left hand, examining special parts with my right. At the close of this examination I was about to return the fellow to his temporary quarters when my left hand slipped slightly, and the now highly indignant *Heloderma* made a dart forward, and seized my right thumb in his mouth, inflicting a severe lacerated wound, sinking the teeth in his upper maxilla to the very bone. He loosed his hold immediately, and I replaced him in his cage with far greater haste perhaps than I removed him from it. By suction with my mouth I drew out a little blood from the wound, but the bleeding soon ceased entirely, to be followed in a few moments by very severe shooting pains up my arm and down the corresponding side. The severity of these pains was so unexpected, that added to the nervous shock already experienced, and to a rapid swelling of the parts that now set in, it caused me to become so faint as to fall, and Dr. Gill's study was reached with no little difficulty. The action of the skin was greatly increased and the perspiration flowed profusely. A small quantity of whiskey was administered. This is about a fair statement of the immediate symptoms: the same night the pain allowed of no rest, although the hand was kept in ice and laudanum, but the swelling was confined to this member alone, not passing beyond the wrist. Next morning this was considerably reduced, and further reduction was assisted by the use of a lead water wash. In a few days the wound healed kindly, and in all probability will leave no scar; all other symptoms subsided without treatment beyond the wearing, for about forty-eight hours, so much of a kid glove as covered the parts involved. After the bite our specimen was dull and sluggish, simulating the torpidity of the venomous serpent after it has inflicted its deadly wound, but it soon resumed its usual action and appearance, crawling in rather an awkward manner about its cage."

The specimen of the Sonoran Heloderm in the Zoological Society's Garden's Reptile House was presented to the collection in July last by Sir John Lubbock, Bart., F.Z.S., by whom it was received from Mr. G. A. Treadwell, of the Central Arizona Mining Company, of Vulture, in Arizona territory. There was much difficulty at first experienced in getting the reptile to take food. After articles of diet of various kinds had been presented to it, and successively refused, it was found that small hen's eggs were sufficiently attractive to induce it to break its fast. Since then the Heloderm has grown less dainty, and has actually condescended to take a small rat, though it prefers eggs to any other kind of food. It may be remarked that it is difficult to conjecture of what use venom can be to an egg-eating lizard.

It may be added in conclusion that Dr. Steindachner, the well-known herpetologist of Vienna, has recently described and figured a new form of lizard from Borneo,[1] under the name *Lanthanotus borneensis*, which is nearly allied to *Heloderma*, and has similarly grooved teeth. It would be of great interest to know whether the Bornean lizard has likewise venomous qualities.

THE TRANSIT OF VENUS

A VERY fair amount of success appears from the telegrams to have attended the British expeditions for the observation of the late transit of Venus. In Jamaica Dr. Copeland and his colleague secured all four contacts; at Barbados Mr. Talmage, though he lost the first external contact, observed the other three; we have no intelligence yet from the station at Bermuda, occupied by Mr. Plummer, nor, of course, from the expedition on the west coast of Madagascar. At the Cape the observers were similarly favoured by the weather, and we hear of very successful observations in New Zealand by Colonel Tupman. The only regrettable failure was at Brisbane, whither Capt. Morris, R.E., had proceeded, with Mr. C. E. Peek. It had been at first the intention of the Committee of the Royal Society to send an expedition to the Falkland Islands, but on learning that other countries intended to occupy stations in that part of the globe, Brisbane was substituted with the view to strengthen the Australian stations, and, so to say, assist in counterbalancing the great number of observations that might be expected in the United States. At the Naval Observatory, Washington, all four contacts were observed with the principal instruments, as also at the Observatory of Haverford, near Philadelphia, and in due course we shall doubtless hear of many more American successes.

At the principal observatories in this country little or nothing was seen of the transit. Dr. Ball, so far as we are aware, was most successful at Dublin; though he did not secure either contact at 2h. 37m. Dublin time he was able to commence a series of measures of distance of the outer and inner limb of Venus from the sun's limb, which he continued to 3h. 3m. He found by calculation from the time observations that at 2h. 43m. 30s. Dublin mean time, the limb of Venus nearest to the sun's centre was 188″ from the sun's nearest limb; and also, that at 3h. 0m. 0s. the limb of Venus furthest from the sun's centre was 162″ from the adjacent limb of the sun. The diameter of Venus resulting from these observations is 64 seconds, corresponding exactly with that deduced by Prof. Auwers from his heliometer measures at Luxor, during the transit of 1874.

On comparing the times calculated from the elements of the transit which have been adopted in NATURE when referring to the phenomenon with those telegraphed to the *Times*, as having been noted by two observers at Washington, and one at Haverford, the following differences between calculation and observation are shown:—

	Washington.		Haverford.
	Frisby.	Sampson.	
	s.	s.	s.
Contact I. ...	−80 ...	+16	−41
„ II. ...	+13 ...	+ 3	+33
„ III. ...	+21 ...	−38	−29
„ IV. ...	+80 ...	+38	+19

Mr. Neison observed the first external contact at Durban at 3h. 54m. 41s. local mean time; if we assume his longitude to have been 2h. 3m. 30s. east, the difference of the calculated time would be − 15s. The view from the observatory there was almost perfect. The conditions were, cloudless sky, but the air was unsteady.

Mr. Marth, writing on November 21, places his station at Montagu Road, Cape Colony, in longitude 20° 3′ E., with 33° 20′ south latitude. At the date of his letter he was fearful that one of the whirlwinds of sand and dust of which he had had much experience might at the last moment spoil all. The heat during the day was overpowering, but at night he was in need of his winter overcoat. The transit observations, however, were very successful.

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[1] Described in. *Proc. Acad Sc. Phil.*, 1869, p 5.

[1] *Denkschr. k. Ak. Wien.*, xxxviii p. 95 (1878).

The following telegram from Mr. Talmage, chief of the British party at Barbados, was forwarded to the *Times* by Mr. Stone:—"Internal contact at ingress, and internal and external contacts at egress were well observed." The observers were Mr. Talmage and Lieutenant Thomson, R.A. On this the *Times* remarks:—

"The observations at ingress will combine with those made at the Cape and those at egress with the Australian and New Zealand observations. An official telegram received from Captain Morris, R.E., confirms that from Mr. Peek, announcing a complete failure at Brisbane. Lieutenant Darwin, R.E., who accompanied Captain Morris, will, before returning to England, determine the difference of longitude between Point Darwin and Singapore, thus completing a connection between the Australian and English longitudes. Information has now been received from all the British stations with the exception of Madagascar and Bermuda.

"From the Paris telegram it will be seen that no news is expected from the Patagonian stations for about a week, and it is feared that the Chilian mission has failed. The Russian, Austrian, and Italian Governments have sent no parties out for observation of this transit; but the former have lent two heliometers to MM. Perrotin and Tisserand, and an equatorial to Dr. Pechüle, who has been sent to St. Thomas by the Danish Government. Spain has sent two parties to the Havannah and Porto Rico; these are provided with instruments of the same class as those of the British parties.

"Many observers have noticed the phenomenon known as the 'black drop,' and in some cases a grayish light, probably similar to that seen by Winthrop in observing the transit of 1769 at Cambridge, U.S., the American observers appear to have specially looked for traces of a satellite of the planet but could see none. A very curious phenomenon was seen by Prof. Langley and others observing at the same station. When half the planet was on the sun's disc a small patch of light appeared near the limb outside the sun; it extended for about 30 deg. along the limb, and was totally distinct from the luminous ring seen surrounding the planet by Prof. Langley and several other observers at different places. Spectroscopic observations were taken at several places in the United States; the spectrum showed some strange lines, and a watery vapour was suspected in the atmosphere of the planet. With regard to the observations made by M. Janssen at Oran, no details have been received, but it would appear that they are likely to prove of considerable value, and will add to our knowledge of the physical condition of the planet.

"The phenomenon of the 'black drop' takes place at the contacts of the limb of Venus when the planet last touches the sun's edge at entry on, and first touches when about to pass off, the disc; it has been noticed by some observers at all preceding transits which have been observed, while others have noticed a brown or greyish ligament joining the limbs of the sun and planet. The atmosphere of Venus was remarked by Hirst, who observed the transit of 1761 at Madras, and subsequently by other observers. When part of the planet has entered on or has moved off the sun, a ring of light has been seen surrounding Venus; this arises from the reflection of the solar light on the atmosphere surrounding the planet. This ring of light was noticed during the transit of 1761, and has been seen at all those of 1769, 1874, and on Wednesday. The phenomenon observed by Prof. Langley has not been observed at previous transits, and is probably due to some local causes. This is the only phenomenon mentioned in the accounts received which has not been previously noticed."

Under date December 12, Mr. Stone sends the following to the *Times*:—I have received the following telegram from Mr. Plummer, at Bermuda:—"Ingress well observed. Egress observed amid clouds." The telegram probably indicates that the observations at egress are not of much value. The egress, however, appears to have been better observed than the ingress at some of the American stations, and there will be plenty of observations of accelerated egress to balance the observations which will be available of retarded egress for New Zealand and Australia. Reports have now been received from all the British stations except Madagascar, which is a most important ingress station, and from Captain Wharton, H.M.S. *Sylvia*. Captain Wharton has two good telescopes, and will have established his party somewhere on the South American coast, where he may, if the weather was favourable, have observed both the ingress and egress, but with small factors of parallax. These observations, if secured, would however be very valuable, as a check upon the results obtained from the discussion of the observations at stations where the time is largely affected by parallax. We are not likely to hear any news of the Madagascar expedition for some weeks. The British expeditions have, on the whole, been most successful, and a valuable result is assured.

Up to the present time the following additional details have appeared in the *Times* as to the observation of the transit at home and abroad. At home the meteorological conditions were generally unfavourable:—

At Greenwich Royal Observatory the Astronomer Royal had made considerable preparations for observation, and shortly before two o'clock the whole of the staff were at their instruments, ready to take advantage of even a break in the clouds; but unfortunately the dense stratum of cloud which lay beyond the occasional rapidly passing patches of scud prevented even the sun's position being discerned. Arrangements were made for taking a number of photographs, a photoheliograph having been specially erected to view the sun until it reached the horizon. At the Radcliffe Observatory, Oxford, Mr. E. J. Stone had made considerable preparations for observation, but the sun was only visible for about five seconds, when the planet was seen on the solar disc, well separated from the limb. At Bath the haze which was prevalent during the morning cleared away, and the transit was visible till sunset. In South Wales the sky was clear until shortly before sunset. At Penzance, Plymouth, and Cork the sky was cloudless. Mr. J. Burns, at the Castle, Wemyss Bay, observed the external contact at 2h. 6m. 38s., and internal contact at 2h. 20m. 32s. (Greenwich mean time). The Rev. W. S. Lach-Szyrma, at Penzance, saw the transit from the time of contact to sunset; the black drop was clearly seen.

The astronomers at Potsdam succeeded in taking good photographs of the transit. In France, no observation could be made. At Paris, Bordeaux, Grenoble, Lyons, and Marseilles it was cloudy. MM. Thollon and Gouz, in Portugal, could also take no observations. M. Dumas received telegrams giving the main results of the observations of the transit in Oran, Martinique, and Mexico. In Martinique, M. Tisserand detected the first contact of the planet and the sun, but unfortunately he had scarcely commenced recording his observations when a cloud came over and concealed the rest of the phenomenon. At Puebla, on the other hand, M. Bouquet de la Grye had an unmixed success. The entire transit was visible, and he was able to take observations for determining the parallax. He will now, of course, work out these calculations, which promise to be amongst the most important of all the observations. At Oran M. Janssen was likewise favoured with sunshine. He was not commissioned by the Academy, but made spectroscopic observations on his own account. In this department he seems to have admirably succeeded, having obtained capital photographs 30 centimetres in size. He telegraphs that he has not only taken excellent photographs, but that he has further been able to observe atmospheric phenomena. As to Col. Perrier, who was posted in Florida, the French Foreign Office have received a telegram reporting full success, but giving no details. No telegrams from the missions in Patagonia, Chili, and Port-au-Prince have as yet been received. In short, of the results thus far known only observations in Mexico and Florida for the calculation of parallax, and those of Oran with the spectroscope seem to have been successful.

The transit was observed at many places in the United States. Special observations were made at the Observatory of the Central High School of Philadelphia by Professors Snyder and Ritter. The weather was favourable, but clouds obscured the sun during part of the time that Venus was crossing the sun's disc. The sky was cloudy all day. All four contacts were observed, and the last two well observed. The weather was not so favourable for the observation of the first two. The planet was seen off the disc at first, and in the fourth with a ring of light frequently visible. While the exact time has not yet been computed, it is known that the first two contacts were in advance of the ephemeris. Prof. Snyder says that just at or before the first contact the planet was projected on the chromosphere. The point where this occurred was verified by a notch of the advancing planet. As Venus approached the second contact a bright luminous horn darted out from the sun round the planet, but not encircling it, being only visible on one side. The same thing was also visible at the third contact. Just before the second contact the edge still off the sun was illuminated by a most beautiful hazy ring of light, seeming to have a sensible breadth. During the second contact the ligament phenomenon was visible, but not so markedly as it was observed in the case of the transit of Mercury in 1878. Just preceding and during the second contact the atmosphere was hazy, but the phenomena were well observed nevertheless. The weather at the third contact was much better, and the ligament phenomenon was not noticed, though a faint obscuration of the luminous line existed just before the geometrical contact, the latter being well observed. After the third contact the horn appearance again came, there being several times noticed evidences of a ring of light. At the last contact, and after the notch had disappeared, the planet seemed to linger off the edge of the sun. The Philadelphia observations of all four contacts are considered to have been successful. A snowstorm prevailed in Canada and the Northern portion of the United States, seriously interfering with the observations elsewhere. But successful views of at least part of the contacts are reported from Ottawa, Albany, Howard University, near Boston; the Naval Observatory, Washington; and the Johns Hopkins University, Baltimore.

Prof. Sharpless, posted at Haverford College Observatory, near Philadelphia, reports the Washington mean time of the contacts as follows:—First contact, 9h. 56m. 5s.; second contact, 9h. 15m. 49s.; third contact, 2h. 39m. 43s.; fourth contact, 2h. 59m. 51s.

At the Washington Naval Observatory the observers slightly differ in the times recorded for the contacts. Prof. Frisby, who had a six-inch equatorial, reports that the first contact occurred at 8h. 56m. 45s.; the second contact at 9h. 16m. 9s.; the third at 2h. 38m. 57s.; the fourth at 2h. 58m. 55s. Prof. Sampson, with a nine-inch equatorial, reports the first contact to have happened at 8h. 55m. 9s.; the second at 9h. 16m. 19s.; the third at 2h. 39m. 56s.; the fourth at 2h. 59m. 37s.; the time of the fourth contact is somewhat uncertain, owing to the prevalence of clouds. Washington mean time was used. Fifty-three photographs were taken during the transit. The professors report that their labours were generally successful, and that if other stations were equally fortunate the result ought to be computed within two years.

Successful observations were made at Yale College, Newhaven, and also by Professor Draper in New York, who got good photographs. The French Astronomical Commission succeeded, at St. Augustine, Florida, in taking 200 photographs. Partially successful results were obtained by the Belgian Commission at San Antonio, in Texas, where 204 photographs were taken of the later phases, the first two contacts being lost. Fully successful observations were made at San Francisco, with 48 photographs; and partly successful ones at Cedar Keys, Florida, where the first contact was lost, while the other three were well observed.

One hundred and eighty photographs were successfully taken by the German Commission at Hartford, Connecticut. They failed to observe the first contact, but afterwards got eight full sets of heliometric observations, which made all they desired, and which they consider very satisfactory. No trace of a satellite was visible. Partly successful results were further obtained by the Germans at Aiken, South Carolina, where they lost the first two contacts, but got three sets of heliometric measurements in the afternoon.

At the Harvard College Observatory spectroscopic observation showed no perceptible absorp-ttion of the sun's light by the planet's atmosphere.

Telegrams announce a complete success in New Zealand, Panama, New Mexico, Jamaica, and some parts of Australia. In New Zealand, England was represented by Colonel Tupman and Lieutenant Coke, R.N., both observers in 1874. The observations of the transit are described as very successful, and Colonel Tupman expected that the observations for determination of the longitude would be complete by Sunday last. The United States party, under Mr. Edwin Smith, observed at Wellington, and were successful in taking two hundred and thirty-six photographs. Of the Australian stations perfectly successful observations were secured at Hobart Town (Tasmania), Wentworth (New South Wales), and in South Australia. At Adelaide the transit was slightly obscured by clouds, but no information to hand states whether the contacts were observed or not. In Queensland no success was obtained. Mr. Russell at Sydney arranged to provide about ten observers at lofty stations along the east coast; heavy rain fell in Sydney and Gippsland, but it is probable that observations have been secured by some of the observers, although no success was obtained at the Sydney Observatory. At Melbourne observations were secured, and twenty-three photographs taken. The Government of Victoria provided for two or three stations respecting which no information has been received, but judging from the state of the weather in Melbourne, there is a probability of success.

We have received the following communications on this subject:—

In a communication from the observatory of the Collegio Romano we are informed that the observations of the transit at Rome were quite successful, although the sky a few minutes before contact was cloudy. Signor Tacchini observed the contacts with the grating spectroscope applied to a Merz refractor of 25 c., and M. Milloseisch simply used a Cauchoix refractor of 15 c. in the ordinary way. In the morning, Signor Tacchini, was able to make his usual spectroscopic observations on the limb of the sun, and he saw that on that part of the limb at which the first contact would take place, the chromosphere was regular, but composed of very active flames, and two protuberances bounded the section (*trait*) of the chromosphere, on which the planet might be looked for before the first external contact. In fact, Signor Tacchini, at 2h. 24m. 33·8s. mean Roman time, saw the edge of the planet on the sharp points of the chromospheric planes He continued to see very clearly the planet advance towards the base of the chromosphere, and he observed the first external contact at 2h. 48m. 54·43s. Afterwards he watched the complete reappearance of the chromosphere, and then he noted the first internal contact at 3h. 9m. 34·79s. The image of the chromosphere was always very well preserved, and the size of the planet projected upon it always very clear. Prof. Milloseisch observed the contacts at the following times:—First external contact, 2h. 49m. 48·14s.; first internal contact, 3h. 9m. 29·34s., for the moment of the appearance of the black drop, and 3h. 10m. 10·14s. for the moment of the disappearance of the drop. Between the times noted by the two observers for the first contact, the difference amounts to 94 seconds, which clearly proves the great advantages of making use of the spectroscope. Shortly after the first contact, Prof. Milloseisch perceived for the first time the presence of the planet's atmosphere, verified by Signor Tacchini and his assistant. Signor Tacchini even observed in the spectroscope the phenomenon of absorption by that atmosphere, as in Bengal in 1874, and even at Palermo something of the same kind has been seen. MM. Tacchini and Milloseisch did not see the entire planet before the first contact. The atmosphere of the planet was more active near the edge of the sun. Prof. Milloseisch estimates the height of the atmosphere of Venus at one-fourteenth of the planet's diameter. Signor Tacchini found the diameter of Venus to be equal to 67″·25.

I HAD the advantage of seeing here yesterday the transit of Venus, under exceptionally favourable circumstances, by means of a very simple and ingenious apparatus fitted up by my cousin, Mr. J. Campbell, of Islay. The image of the sun was thrown from a small telescope, properly focussed, upon a large sheet of cardboard paper, in a dark room. The size of this solar image was a little more than two feet in diameter. Upon this image the solar spots and some brilliant "faculæ" were very distinctly visible. As the time approached, Mr. Campbell expected that we might see the planet whilst yet some little distance from the illuminated edge of the sun, owing to the atmosphere of the planet catching and reflecting some solar light before the apparent contact. I believe Mr. Campbell had seen this on the occasion of the transit, in the clearer atmosphere of Japan. Here, none of the party could detect the planet before its disc began to impinge on the edge of the sun. But when the planet's disc had advanced about one quarter of its own diameter upon the solar image, then a faintly luminous ring was distinctly seen defining the rest of the planet's disc, in the darkness out of which it was moving. For some time I was incredulous as to this appearance; but before one half of the planet's disc had crossed the illuminated edge of the sun, the luminosity of the other side of that disc was too distinct to be doubted, and the appearance was very striking and beautiful. I may mention that the size of the planet's disc was, as nearly as possible, seven-tenths of an inch. The time of contact was exactly 2.28 p.m.

Cannes, December 7 ARGYLL

AT 1h. 48m. 28s. Dunsink mean time, I first saw the sun through an opening in the clouds. Venus was at once seen (in the finder of three inches aperture attached to the south equatorial), and was estimated to be about one-third of the way on the sun. But the snow and clouds again intervening, there was nothing more to be seen until 2h. 37m. 19s., when I was enabled to commence a series of micrometric measures with the large instrument. I used a polarising eye-piece and a power of 177 with the Piston and Martin filar micrometer. The limb of the sun was boiling furiously, and Venus was often of any shape but a circular disk. The measures were consequently by no means easy. I set one wire tangentially on the sun's limb, and the other on that of Venus. Altogether I was able to make sixteen of such sets, nine being made with the limb of Venus nearest the sun's centre and the remainder with the other limb. The following are the results:—

Dunsink mean time. h. m. s.	Far limb of Venus. ″	Near limb of Venus. ″
2 37 19	171	—
39 24	177	—
40 42	185	—
42 18	187	—
44 13	191	—
45 20	190	—
46 22	198	—
48 17	196	—
52 16	—	142
54 16	—	149
55 36	215	—
58 17	—	161
59 36	—	164
3 0 46	—	161
1 41	—	164
2 51	—	170

These results have not been corrected for refraction.

I conclude from the mean of the first series that at 2h. 43m. 30s. the far limb of Venus was 188″ from the limb of the sun, while at 3h. 0m 0s. I conclude from the second series that the near limb of Venus was 162″ from the sun. By a projection of the results it is easy to see that the diameter of Venus must have been 64″.

My assistant, Mr. Rambant, was observing with the small equatorial, which is 78 metres from where I was observing. He reports as follows: "At 1h. 45m. the clouds, which up to that time had obscured the sun, cleared away, and I saw the planet with about one-half of its disc projected on that of the sun, but a snow-shower coming on almost immediately, I was unable to perceive any trace of light round Venus, or even to follow its outline beyond the limb of the sun. By the time the snow cleared away the internal contact was passed, and Venus appeared at about twice of its own diameter from the sun's limb; the sun's light appeared of great brightness right up to the dark disc of the planet except at the northern limb, where I suspected a dark brown fringe, but the boiling was such that I could not be certain of this.

R. S. BALL,
Astronomer Royal of Ireland
Dunsink Observatory, Dublin

THE transit of Venus was well seen at this observatory owing to the unusually favourable state of the weather. I observed it in the Markree refractor with an aperture reduced to five inches. I did not meet with any difficulties and saw no "black drop," perhaps because I had focussed the eyepiece on double stars the night before. Owing to the boiling of the sun's edge, I did not see Venus till 1h. 27m. 38s., external contact having taken place previous to this. I then measured the distance between the cusps micrometrically, and from a provisional reduction of these observations it appears that Venus was bisected at 1h. 37m. 53s. The internal contact was first noticed at 1h. 46m. 40s., when a fine line of light appeared at the outer edge of Venus. At 1h. 47m. 58s. the cusps met for an instant, but did not unite permanently till 1h. 48m. 28s. (Markree mean time). Venus was visible on the sun till sunset. I measured its semi-diameter =29″·07. W. DOBERCK

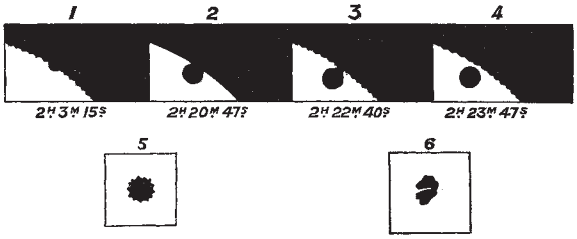
Markree Observatory, December 7

THE ingress of Venus was observed at the Armagh Observatory under very favourable circumstances. I employed the 15-inch reflector in the Newtonian form with an unsilvered flat mirror and a negative eyepiece (power 140) and glass wedge. With an aperture of eleven inches the sun's limb was "boiling" considerably, so that I missed the exact moment of external contact; but having reduced the aperture to seven inches, the internal contact was very well seen. At 1h. 49m. 31s. local M.T. the whole circumference of Venus could be seen; at 1h. 54m. 49s. I saw a faint shade-like object between the cusps, which broke at 1h. 55m. 24s., when a very thin bright line separated Venus from the sky outside; 27s. afterwards the interval was very conspicuous. Rev. Ch. Faris, assistant astronomer, observed with the 4-inch finder attached to the same instrument, and every care was taken to make the two observations independent of one another. He observed external contact at 1h. 35m. 34s., and saw the cusps meeting at 1h. 55m. 10s. without observing any disturbance of the limb. Good determinations of time were obtained on the previous and following evenings. J. L. E. DREYER

Armagh Observatory, December 9

THE all-important 6th of December, 1882, will long be remembered by us in Lochaber, who had eagerly looked forward to a sight of the transit of Venus. Our hopes were realised to the full, and considering our somewhat high latitude, we were privileged indeed. An account of the meteorological conditions will be of introductory interest. A barometric depression had two days previously travelled down from the vicinity of the Faroe Islands, bringing overcast weather and rain—very discouraging—but the mercury rapidly rose in its rear on the night of the 4th, light north-easterly winds set in, the sky cleared on the 5th, and free radiation, and a hard frost followed with charming winter weather. At 9 a.m. on the 6th the barometer, corrected and reduced to 32° F. and mean sea-level read 29·677, and was steady, dry bulb 27·3, iced bulb 26·1, giving a vapour tension of ·112, relative humidity 76 per cent., and a dew point of 20·9. Light airs were noted from north-east by east, and some pieces of innocent-looking cumulus clouds were observed. Browning's spectroscope, soon after 9 a.m., showed an entire absence of rain-band to the left of the D line, in the solar spectrum, but a broad telluric band stronger than usual was observed on the right of D; this, however, did not much distress me. The meteorological conditions generally continued much the same, the weather being very fine. When the hour for the beginning of the transit drew nigh, I repaired to a field adjacent, entirely open to south-west, with telescope and sketching equipment. Here an uninterrupted view of the sun could be obtained. The instrument employed has a clear aperture of 2¾ inches, object-glass of first quality by Dancer of Manchester, power used 70. A few clouds near the sun about 1.53 caused anxiety, but they soon cleared off, and a perfect and continuous view of the sun was obtained. Two good watches and clock were set to Greenwich mean time, obtained with all possible accuracy from post-office signal in the morning. Considering the sun's low altitude, the thick stratum of atmosphere traversed by the oblique rays, tremors of the air, and effects of atmospheric refraction, the phenomenon of the ingress was well observed in the telescope. The external contact, when the dark body of Venus just indented the sun's limb, south-east by south, took place at 2h. 3m. 15s. Greenwich mean time (see sketch No. 1), by 2h. 13m. 0s. the half of the planet was upon the sun; sketch numbered here 2 (several others not now given were taken) was made just before the internal contact; and at 2h. 22m. 40s. I noted the internal contact. At this time (sketch No. 3) I observed the ligament joining the edges of Venus and the sun, like the thread between two drops of water when about to part, and the planet was much in shape as an apple with the stem joining on to the edge of the solar orb. At 2h. 23m. 47s. (sketch No. 4) Venus was as a round black spot upon the sun, and clear of his edge, and a narrow streak of light intervened. By this time friends had gathered around, and as the chief observations had been made they were enabled to take turn at the instrument and watch the progress of the planet in its course across the sun's disc, until a mass of cumulus cloud at 2.45 put a stop to observation. The outline of Venus against the sun was very irregular (sketch No. 5). Mr. Colin Livingston, of the public schools, also observed the ingress independently, and we agree to the very second that the internal contact took place 19m. 25s. after the external contact. The sun's photosphere by the way was almost wholly free from spots. Just a stippling was observed a little west from the centre, and a small disturbance was noted in perspective near the eastern limb—in marked contrast with the great spot regions well observed here on November 16, and now probably existing in the opposite hemisphere. The sun's edge was very uneven, as I have attempted to show in the sketches. The highest temperature during the day, it is worthy of mention, was only 30·9, and pressure remained fairly steady at a mean of 29·670 at sea-level. Views of the transit were again obtained before sunset, but the intensity of refraction near the horizon so distorted both the sun and Venus—the former being like an egg in shape, and the latter at times as shown in sketch No. 6—that I could but wistfully watch them go down together on a gorgeous sky behind the snow-clad heights of Beinn na Cille, envy our cousins in the west their sight of the egress, and wonder under what strange circumstances the next transit will be observed in the year of our Lord, 2004. CLEMENT LINDLEY WRAGGE

Fort William, December 10



Transit between 2.30 and 2.45.

Venus distorted shortly before sunset, photosphere apparently bisecting planet.

The Transit of Venus (Ingress) as observed by Clement L. Wragge.

THIS rare phenomenon was well observed here on the 6th inst. The few clouds which partially hid the sun during the first stages of the transit, only served a useful purpose in moderating the sun's brilliancy. At about 2 p.m. a dark indentation was observed on the south-east margin of the sun's limb, and it was evident the phenomenon had commenced. A few minutes later this indentation had developed into a semicircular notch, and at about 2.21 p.m. the black and now complete circle of Venus had fully entered upon the solar disc. It was very large and conspicuous, and its effect, even as observed in small telescopes, was very striking. The opaque and well-defined globe of the planet was projected with remarkable boldness upon the sun's bright photosphere. Protecting the naked eye with deeply tinted glass, the planet was very plainly seen; indeed, the dark spot was thus clearly distinguishable before it had entered fully upon the sun, and while it had notched the disc. The planet appeared to be surrounded by an annulus of reddish hue, and over the central parts there was diffused a patch of faint light. The region of the disc just within the margin was very black. These effects may, however, have been purely telescopic. I used a reflector of 4-inch aperture, with which the definition was not all that could be desired. There were very few of the ordinary sun-spots visible. A small irregular group lay slightly to the south-west of the centre, and another with much feculæ, near the eastern limit, but they were of very insignificant character, and not at all comparable to some of the fine spots which have been recently visible on the solar surface. To an observer accustomed to the appearance of these objects, the view of Venus now in transit must have been of extreme interest, and he could not fail to be struck with the marked difference between the black circular disc of the planet, and the more irregular and far less intense forms of the ordinary sun spots. As the transit progressed, the sky continued clear, so that it could be watched until near sunset, but the telescopic view became less effective, owing to increasing atmospheric undulation, which, as usual with objects at low altitudes, greatly impaired the definition. W. F. DENNING

Bristol, December 9

SOME parts of the transit were well seen here. I used a 3¼ Merz refractor, power 60. The external contact was excellently seen. I watched for those peculiar phenomena (black drop, &c.) which have created so much interest, but was able to see nothing of them. At the moment of external contact, I had the point of impact in the centre of my field, and the planet indented the edge of the sun with a black and perfectly circular segment, disturbed only by the "boiling" appearance characteristic of the solar edge. I watched the planet advance upon the sun to within, I guess, a few seconds of internal contact, when unfortunately the sun became obscured by a small cloud. At the time of observation, so near was internal contact, that I could every now and then see the boiling appearance of the solar edge peeping out from behind the black edge of the planet; but no other distortion of the planetary or solar edge was observable, except what arose from the "boiling" appearance referred to. D. TRAILL

Raleigh Lodge, Exmouth, December 7

THE transit of Venus was perfectly seen here yesterday. The sky was overcast quarter of an hour before, but the first and second contacts took place on a clear disk, and the first was almost instantly apparent with a hand glass. The sky remained clear till considerably past three. Considering the total failure in London and Paris, one could wish that some trained observers had selected our south coast. HENRY CECIL

Bregner, Bournemouth, December 7

P.S. As a consequence of popular ideas and anticipations as to celestial phenomena having got "a little mixed" lately, my gardener asked me this morning "*if I saw the star fall into the sun yesterday.*"—H. C.

THE transit was seen here to great advantage, the day being exceptionally fine, the sun shining brightly from about 9·30 till sunset, with the exception of a few passing clouds at noon, and one small cloud obscuring the sun from 2.30 to 2.35 p.m. According to the times and positions of the sun and planet, given in the *Nautical Almanack*, I had made a diagram as correct as I could of the sun with the path of Venus across his disc; but if I had relied entirely upon the diagram I should have missed the place of external contact, as I found afterwards I had drawn the position of Venus considerably too high. To make sure of my object I depressed the telescope so as to keep as much of the sun as possible out of the field of view, and only allowing a portion of his limb to appear, and at 2h. 3m. 11s. I picked up Venus depicted against the sky, and just coming in contact with the sun's limb. Her disc appeared a trifle paler than the background, and was surrounded with a very thin circle of light which appeared a little wider on that side furthest from the sun. It was this light which attracted my attention, and enabled me to identify the planet. At 2h. 3m. 20s. the first *touch* of Venus upon the sun's limb took place. I now watched with much interest to see if it was possible to detect signs of an atmosphere to Venus—changing the eye-pieces. Sometimes I thought there were visible signs of it, but I would not say decidedly that it was so. I noted with some surprise that the planet appeared much smaller upon the sun than it did immediately previous to contact. At 2h. 23m. 31s. internal contact took place. The planet appeared to pass clear off and away from the sun's limb, without showing the least sign of a "black drop," or any appearance of a lingering connection between her limb and that of the sun. The telescope used is an equatorial with driving-clock, silvered glass reflector 8½-inch diameter and 7 feet focal length; eye-pieces ranging from 30 to 17c of magnifying power. I took three photographs between 2h. 35m. and 2.45, but the spring of my instantaneous shutter did not act as it should, and therefore the photographs are not so good as I could wish, but Venus can be readily seen upon the sun's image in the negative.

Silverton, Devon, December 9 R. LANGDON

NOTES

THE following are the probable arrangements for the Friday evening meetings before Easter, 1883, at the Royal Institution:—January 19, R. Bosworth Smith, M.A., The Early Life of Lord Lawrence in India; January 26, George J. Romanes, F.R.S., Recent Work on Starfishes; February 2, Sir William Thomson, F.R.S., The Size of Atoms; February 9, Moncure D. Conway, M.A., Emerson and his Views of Nature; February 16, Prof. William C. Williamson, F.R.S., Some of the Anomalous Forms of Primæval Vegetation; February 23, Walter H. Pollock, M.A., Sir Francis Drake; March 2, C. Vernon Boys, A.R.S.M., Meters for Power and Electricity; March 9, Prof. George D. Liveing, F.R.S., The Ultra-Violet Spectra of the Elements; March 16, Prof. Tyndall, F.R.S.

MR. H. O. FORBES, on his return to Amboina from his first visit to Timor-laut, writes as follows:—"Extended movements were impossible, so that my botanical collections are not very extensive, but the ornithological and anthropological parts are very good. I am now engaged in packing them up for despatch, and hope to send them off soon. My intention is to return to Timor-laut in a few days, if my health will permit, by the Government steamer which leaves for the Tenimber Islands. I shall settle in some more quiet spot than Ritabel. A full report on this interesting country shall be sent by next mail. One of the singular facts I observed is the immense herds of wild buffalo existing on the mainland of the island. They must have, of course been introduced, but by whom, and how long ago, is an interesting question. I was unable to get a specimen unfortunately. My wife, who accompanied me, aided me greatly, so that when I was down with fever (and the fever is of extreme severity) the work was still able to go on." Mr. Forbes' collections will be consigned to the Committee of the British Association for the exploration of Timor-laut, as arranged when the expedition was determined on.

THE Accademia delle Scienze dell' Istituto di Bologna has lately announced that a gold medal of the value of 1000 lire (say 40*l.*) will be presented "to the author of that memoir which, proceeding on sure data either of Chemistry or of Physics, or of Applied Mechanics, will indicate new and efficacious practical systems, or new apparatus for the prevention, or extinction of fires." Memoirs must be written in Italian, Latin, or French,